NISTTech

Damped Superconducting Coil System with Multiturn, Planar Geometry Superconducting Coil & Shunt Resistors Electrically Connecting Successive Coil Turns

Dampens coil resonances inherent in input coils of superconducting quantum interference devices (SQUIDs)

Description

Improve apparatus and methods for damping resonances in planar geometry superconducting coils by adding an internal damping resistor across the windings of the coil.

Resistive damping is added to each turn of a multi-turn superconducting coil by an intracoil shunt connecting a plurality of turns of the coil with resistors. The coil could be a signal coil or a modulation coil of a superconducting quantum interference device (SQUID), an inductor in a filter, or a winding in a transformer. The shunt may be a planar-film resistor which extends along a radius of the coil, or along more than one radius of the coil.

Applications

- **Fabrication of superconducting electronic devices**
  Reduces resonances in SQUIDS

Advantages

- **Reduces resonances**
  Dampens resonance induced changes in the impedance of the coil or ground plane

Abstract

The operation of a planar geometry superconducting coil used in conjunction with a ground plane is improved by intracoil damping. This damping reduces coil resonances. The improvement consists of an intracoil shunt, which damps the resonances of the coil by connecting each turn, or loop, of the multiturn/multiloop coil with resistors. One example of a planar geometry superconducting coil which is effectively damped according to the present invention is the input coil to a superconducting quantum interference device (SQUID). The intracoil shunt may be added to the SQUID at the same time in the SQUID fabrication as the junction shunts.

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Citations

1. M.E. Huber, A.H. Steinbach and R.H. Ono. Resonance Dampening In Tightly Coupled DC SQUID's via Intra-Coil Resistors. Physica C 351, 2001, 85-90.

References

- Expired U.S. Patent # 6,169,397
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Status of Availability

This technology is available in the public domain.

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